The movable arm **110** of the switch **87** is normally, i.e., in the viewing position of the shield **41**, in the open position in which it engages the dead contact **112**, and is moved into engagement with the contact **111** by the action of its associated cam **64**. However, the movable arm **110** is also incorporated in a relay, in which energization of the relay control coil **113** causes the arm **110** to be moved from engagement with the live contact **111** and into engagement with the dead contact **112**.

The relay coil **113** is automatically energized to effect the desired opening of the switch **87** immediately upon triggering the laser in the manner previously described. To this end, and as shown in FIGURE 6, the relay coil **113** is connected through a delay network **114** and the delay network **107** to the voltage level sensor **100**. The delay network **114** permits the application of the control voltage to the relay coil **113** immediately following closing of the electronic switch **196** to apply the trigger voltage to the housing **25**. The relay coil **113** is energized before the capacitor bank **98** can recharge the level required for applying the charging and triggering voltages to the laser. Immediately upon the relay coil **113** being energized, the switch **87** is opened, thereby preventing further laser operation.

FIGURE 10 illustrates the positions of the switches **86–88** under such conditions. The shorting switch **86** remains open, and the switch **88** remains closed. However, the switch **87** has been opened, to place the movable arm **110** in engagement with the dead contact **112**.

With the switches **86–88** set in the position shown in FIGURE 10, the operator must manipulate the control knob **60** in order to initiate another one-shot laser operation. To do this, he needs only to rotate the knob back sufficiently to permit the cam **64** to reset the movable arm **110** of the switch **87** and cause it to engage the fixed contact **111**. However, immediately upon starting such backward travel, the cam **65** permits the switch **88** to open. Accordingly, upon moving the cams to the position in which the switch **87** is again closed, the operator must then return the control knob to the position in which the shield **41** is in its upper position, whereupon the switch **88** is again closed to initiate the charging and triggering cycles.

The operator may also return the control knob **60** to the position in which the shield **41** is in the viewing position, thereby resetting all the switches **86–88** to the positions shown in FIGURE 6. When this occurs, the shorting switch **86** causes the capacitor bank to be completely discharged. Thereafter, rotation of the control knob in the opposite direction, until the shield **41** is in its upper position, effects the same sequence of switch operations as previously described and as shown in FIGURES 6–9.

Referring again to FIGURES 1 and 2, the voltage level sensor **100** is shown as a voltmeter which is secured to the top panel **120** of the laser housing **13**. As shown, this panel is provided with an upwardly sloping face **120'** which is provided with a window **121** through which the operator can view the dial **122** and pointer **123** the voltmeter **100**. The voltmeter is also provided with a set point selector needle **124** and a selector knob **125** with which to set the needle **124** at the desired position. When the pointer **123** reaches the same dial position as the needle, the electronic switches **101**, **106** (FIGURE 6) are operated to effect the laser charging and triggering cycle.

Thus, the operator is able to observe the position of the pointer **123** as it moves up the scale and select the point at which the laser fires. Additionally, the operator can tell, from the position of the pointer **123**, the magnitude of any residual charge on the capacitor bank after firing. Any such residual charge should be removed upon turning the control knob **60** back to the starting position in which the shorting switch **86** is closed. But if any charge is still indicated on the voltmeter after thus operating the control knob, the operator is alerted to a malfunction that exists and is to be corrected before again operating the equipment.

From the foregoing, it will be apparent that various modifications can be made in the laser tool construction illustrated without departing from the spirit and scope of my invention. Accordingly, I do not intend that my invention be limited, except as by the appended claims.

I claim:

1. A laser tool comprising:

a housing;

a laser device supported in said housing, said laser device being adapted to generate and direct a laser beam in a predetermined direction upon application thereto of a charging voltage and a triggering voltage;

a beam deflector carried by the housing and located in the path of the beam to deflect the beam along a predetermined path to the exterior of said housing;

means to permit an object exteriorly of said housing and along said predetermined path to be viewed through said deflector, said means including a lens structure having a viewing axis aligned with said predetermined path;

circuit means for applying power to said laser device to create a laser beam, including switch means to be operated to permit charging and triggering voltages to be applied to the laser device; and

an external manual control member mounted in said housing and coupled to said switch means and including a movable shield element disposed adjacent said deflector, said member being operable in one position thereof to position said shield element between said deflector and said laser device and to prevent operation of said switch means while permitting viewing of an object through said deflector, and in another position thereof to position said shield element on said viewing axis between said deflector and said lens structure to thereby prevent any light energy from propagating along said viewing axis toward said lens structure and to operate said switch means to cause the charging and triggering voltages to be applied to said laser device.

2. A laser tool as defined in claim **1**, including a pair of switches in said circuit means to be selectively operated before applying a charging voltage to said laser device;

means operable by said manual control member during its movement from said one position to said other position thereof to operate one of said switches, and operable upon said manual control member reaching said other position thereof to operate the other of said switches; and

means responsive to operation of said other switch to sequentially apply charging and triggering voltages to said laser device.

3. A laser device as defined in claim **2**, further including a third switch, said switch operating means being operable during the period between operating the switches of said pair to operate said third switch, said third switch permitting the charging voltage to be applied to said laser device when said other switch is operated; and means operable upon application of the triggering voltage to said laser device to actuate said third switch and prevent further application of charging and triggering voltages to said laser device.

4. A laser tool as defined in claim **1**, wherein said manual control member is a knob; a shaft extending at one end through said housing and toward said deflector, said knob being secured to said one end of said shaft, and wherein said shield element is a plate secured to the inner end of said shaft.

5. A laser tool as defined in claim **4**, including a pair of spaced limit stops secured to said housing; and means carried by said shaft to engage the respective stops and thereby limit rotation of said knob, said last-named means